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ABSTRACT

Financial estimates for achieving the six national education goals proposed at the Charlottesville Education Summit are provided in this paper. Specific objectives under each goal, as outlined by the National Goals Panel, are assessed. A conclusion is that although the cost estimates have involved huge assumptions and sometimes wide variations, the total cost ranges from approximately $34-$77 billion. However, the cost must be considered in the context of time; educational improvement is an ongoing process of maintaining achievement standards. A comparison with national health care costs illustrates that funding for education would take up a considerably smaller share of the Gross National Product even at the $77 billion level; in any case, an educated citizenry is at least as necessary for the nation's survival. But the cost of the education goals must be considered in the context of time, recurring every year into the indefinite future. Finally, the technical means and financial resources may be within the nation's grasp. Two tables are included. (Contains 16 notes.) (LMI)

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National Education Goals:

Can We Afford Them?

by

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National Education Goals:

Can We Afford Them?

The 1989 Charlottesville Education Summit was a major benchmark for American education. A set of six national education goals was presented, discussed, and agreed to by the President, state governors, and representatives of both major national political parties.

The Summit and its outcomes were precedent shattering from several perspectives. It was only the third time in history that a United States President had convened all the nation's governors. It was the first serious high level political discussion ever given to a set of concrete national goals for American education. A three-hundred year phobia regarding national control over education had been substantially assuaged. An opportunity was created, and may still exist, to mobilize public opinion and resources behind a serious effort to enhance American education and educational opportunity.

In the time since Charlottesville, the goals have been discussed in policy circles and debated among education professionals. However, a sluggish economy, a strong anti-politics national mood, widespread state budget deficits, and an unprecedented federal government debt burden may have dampened political enthusiasm. Also, there may be a view in some circles that the goals are too idealistic in concept, too advanced in terms of technical knowledge, and too costly in practice.

Thus, as the United States approaches the November 1992 election, the goals appear to have been relegated to the political back burner. On again off again Presidential candidate Ross Perot never referred to them publicly. Democrats Clinton and Gore, while certainly mentioning education frequently, have paid little specific attention to the goals. Even President Bush, putative father of the nation's first set of serious goals, seems to have abandoned them as a serious objective. However, if the national education goals become policy orphans, it will be a pity.

The purpose of this paper is to stimulate renewed discussion about the national educational goals by providing financial estimates for achieving them. The surprise message here is that the technical means and financial resources for claiming the goals may be within the nation's grasp. It would seem a shame to forego the opportunity.

America's National Education Goals

By the year 2000:

•All children in America will start school ready to learn.

•The high school graduation rate will increase to at least 90 percent.

•American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.

•U.S. students will be first in the world in science and mathematics achievement.

•Every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

•Every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning.

National Education Goals Cost Summary

Goal #1	**Children Begin School Ready to Learn Program**	**Added Cost Estimate***
	Disadvantaged/disabled Preschool Expenses	$25.4
	Parenting Programs	1.5
	Child Health and Nutrition Supplements	1.5
	Prenatal Care and Counseling	1.26
		$29.66
Goal #2	**Ninety Percent High School Graduation**	
	Partnership Academy Model	$1.5
Goal #3	**Demonstrated Academic Competency**	$1.0
	Low Cost Strategy (Testing)	
	High Cost Strategy (Longer School Year)	$44.
Goal #4	**First in World in Science and Math**	
	Teacher Training/Curriculum Expansion	$2.
Goal #5	**Adult Literacy**	
Goal #6	**Drug Free Schools**	$.05
Total:		**Range: $34.21 - $78.21**

* In billions of dollars

What Will The Goals Cost to Achieve?

Assumptions Make A World of Financial Difference

What will it cost to implement the national goals, and can the United States afford the bill?

These are highly speculative matters, the answers to which are crucially dependent upon whatever assumptions are made about the nation's current status on a particular goal dimension and the strategies to be invoked in achieving goals. However, putting aside such complexities, this paper offers a set of resource estimates for each of the six national education goals.

Goal #1: All Children in America Will Start School Ready to Learn.[1]

There assuredly is little debate regarding the desirability of the target. However, it is difficult to know what the goal encompasses. What does "ready" mean? "Learn" what? For these purposes, what is a "school?" Is it nursery school, kindergarten or the first grade? There is a difference between being ready to be immersed in the socializing agenda of many nursery school and kindergarten classes and a readiness to engage in rigorous academic training. What can be done about parental neglect, child abuse, unwanted and unloved children? Given that much of an individual's learning readiness is determined even prior to birth, does Goal #1 necessitate genetic counseling for prospective parents and prenatal medical and nutritional services? Where do "Crack Babies," low birth weight children, and badly handicapped youngsters fit into this continuum?

Such questions could extend for many pages. Hence the significance of underlying assumptions. An initial estimate of the costs associated with Goal #1 can be built, however, assuming the following general objectives as specified in March of 1991 by the National Education Goals Panel[2]:

All disadvantaged and disabled children will have access to high quality and developmentally appropriate preschool programs that help prepare children for school.

Every parent in America will be a child's first teacher and devote time each day helping his or her preschool child learn; parents will have access to the training and support they need.

Children will receive the nutrition and health care needed to arrive at school with healthy minds and bodies: and the number of low birthweight babies will be significantly reduced through enhanced prenatal health systems.

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[1] The complexity of this topic is illustrated by the multipronged approaches to school-readiness discussed in Deborah L. Cohen, "Complex Set of Proposals Needed to Fill in School-Readiness Puzzle," Education Week, February 12, 1992, Vol. IX, Number 21, pp. 1 and 14.

[2] This "panel' was an outgrowth of the Charlottesville Summit. It assumed the task of developing means for measuring progress toward national education goals. The panels initial report, from which the above-listed "objectives" are taken, is entitled: Measuring Progress Toward the National Education Goals: Potential Indicators and Measurement Strategies.

In effect, these objectives are premised on at least four social policy tactics: (1) preschool for disadvantaged and disabled youngsters, (2) parenting programs, (3) child health and nutrition programs, and (4) prenatal health and counseling programs. Cost estimates associated with these activities are extremely dependent upon the intensity of "treatment" prescribed and the number of clients, or "cases" involved in each program. An initial step is to determine the cost per case and then offer estimates regarding number of cases.

Disadvantaged and Disabled Preschool Programs

Preschool program costs vary widely, depending upon the quality and location of the service, provision of transportation, training of the provider, number of children served simultaneously in a group, and the quality of the facility. Preschool day care, omitting provision of an educational component, is itself expensive. For example, a 1991 Wall Street Journal survey listed preschool child care center fees as ranging from $50 to $250 per week.[3]

Unit Costs. Assume a midpoint, $150, on the above continuum as the cost per "normal" preschool child to be served. This is approximately $30 per day or, in a six hour day, $5.00 per child hour. This should suffice to cover personnel, administrative, transportation, and facility costs.

A handicapped child could be far more costly, depending upon the severity of the disability. As a beginning, however, assume a weekly school fee twice that of a normal child, $300, for each handicapped child to be served. Assume further that the period of annual service for each normal child would be forty weeks and a fifty week service period for handicapped children.

Annual cost per normal preschool child, under this scenario would average (40 X $150) $6,000 and (50 X $300) $15,000 for each enrolled handicapped preschooler. These figures are higher than the current average annual costs per elementary and secondary school student. However, the foregoing estimates include a longer school day and school year. Halving each of these would, obviously, reduce the cost estimates by half.

Numbers to be Served. The next step in estimation is to specify the numbers of children for whom such services would have to be provided. In that the Goals Panel specifically mentions "disadvantaged and disabled" students as the target population, one can assume that all other students would have to depend upon current or private resources to receive these services. The only added costs would be for the two categories mentioned specifically.

Assume that it is the 3-5 year old population for which preschool services are being sought. In 1991 this population was estimated to approximate 11.5 million youngsters. Interestingly, approximately 55 percent of this age group is currently enrolled in preschool, though the overwhelming proportion are only in part time activities.[4]

The total proportion of this group defined as living in a "poverty' condition is 12 percent. (Comparable figures for black and Hispanic children are two to two and one-half times

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[3]Sue Shellenbarger, "Work & Family," The Wall Street Journal, Vol. 125, No. 15, Monday, July 22, 1991, Page B1.

[4] These and subsequent school population figures re derived from various sections of the Digest of Educational Statistics:1990, National Center for Education Statistics, Office of Education Research and Improvement, United States Department of Education, 1990.

higher.). This equates to approximately 1.38 million poverty youngsters for whom, presumably, a public sector preschool subsidy would be necessary. When multiplied by $6,000 per eligible child, this results in a cost figure of $8.28 billion.

The U.S. Department of Education reports that approximately 11.5 percent of all children meet the definitions of handicap qualifying for federally subsidized special education program. When this percentage is applied to the above specified 3-5 year old population figure, the result is 1.32 million handicapped. If this were the figure upon which public subsidy were to be based, the costs of providing preschool service for handicapped youngsters would be (1.32 million X $15,000) $19.8 billion.

The total of these two subsidies exceeds $28 billion. This latter figure is too high. An overwhelming proportion of the handicap population is associated with poverty conditions. Overlap between the two population categories exists. Thus, for a more accurate dollar costs, assume that one third of the total student poverty population is "disabled." The poverty preschool subsidy would then be reduced by 1/3 for a new total of $5.52 billion. The grand total for the two eligible categories, "disadvantaged and disabled" would then be approximately $25.4 billion per year.

Parenting Programs

The Goals Panel's objective for parents to become their child's first teacher is also admirable. Assuming away debilitating parental conditions such as poor motivation, lack of transportation, physical handicaps, criminality, mental incapacity, illness, and substance abuse, how much would it costs to bring one or both of a child's parents up to a speed where they could fruitfully serve as a "first" teacher? This is difficult. It may be that a concerned and compassionate parent, even if illiterate, is more important for the well being of a child than a disengaged or abusive parent who is a Nobel laureate.

Numbers to be Served. Nevertheless, make the assumption that a teacher, even a "first teacher" should be literate. President Bush's America 2000, the 1991 document setting forth the education proposals intended to achieve the national goals, estimates that as many as 25 million Americans are functionally illiterate. However, illiteracy tends to exist disproportionately among Americans 35 and older. Thus, assume that only 10 percent of parents with 3-5 year old preschool children, for whom it would be appropriate for them to serve as "first teachers."[5] are sufficiently illiterate that they will themselves need training in order to assist their children. This would be approximately 1.5 million persons in need of "parent literacy training."

Unit Costs. How much does it cost per illiterate preschool parent to provide appropriate training? Assume eight hours of instruction per week for 25 weeks. Assume further that hourly instruction costs $5.00. Under this scenario, each parent in training would cost (200 hours X $5.00) $1000. Some would be more and some less, but this can stand as an average unit cost figure.

Returning to the 1.5 million parents assumed to be in need of training in order to help their child, the total cost of this program dimension is (1.5 million X $1000) or $1.5 billion.

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[5] Keep in mind that there are 13.5 million 3-5 year olds in the overall population. If there were only one young child per household, this might imply 27 million preschool parents. However, many parent couples have multiple young children. Thus, assume that there are only 15 million preschool parents, of whom ten percent, the proportion of the under 35 population, that are illiterate. This is the set of assumptions and calculations resulting in the above estimate of 1.5 million illiterate preschool parents.

Child Health and Nutrition Programs

No service in the United States is as expensive as health care. As will be discussed at length in a subsequent section of this paper, health care costs have accelerated beyond all reasonable predictions.[6] Guaranteeing good health for every American school age child could in itself occupy as much of the nation's Gross National Product as is currently spent on all of K-12 schooling. Clearly, a completely healthy child population is outside the realm of current possibility.

Unit Costs. In order to place boundaries around this problem, imagine a school health program, with emphasis upon prevention of disease and decay, on which $1,000 for professional services was allocated annually for each low income youngster enrolled in preschool. This would allow for at least two medical examinations or consultations per month plus pharmaceutical drugs. Of course, in cases of extreme illness or trauma, this amount would be far from sufficient. In general, however, this amount should be sufficient to maintain careful scrutiny of youngsters.

For preschoolers from extreme poverty households, assume an additional $1,000 annually, to be available upon a physician's prescription, for nutritional supplements to ensure a healthy diet. This supplementation would be in addition to whatever welfare aid the child or family currently received. Thus, the total additional cost per poverty preschool child would be $1,000 and could go as high as $2,000 in extreme cases, say ten percent of the total.

Numbers to be Served. Here again, conservatively assume the proportion of preschool youngsters living in poverty to be 12 percent of the 11.5 million 3-5 year olds. This is 1.38 million eligible children. Multiplying unit cost by this number results in an annual figure of $1.38 billion. Another ten percent of this for nutritional supplementation would bring the annual total to slightly more than $1.5 billion.

Prenatal Health Care and Counseling

Number to be Served. The Untied States is now experiencing approximately 4 million live births each year. (This figure may decline, once the unusually large current cohort, the so-called post World War II "baby boom," group, of women in their prime child bearing years subsides.) Prenatal care is known to be crucial for the health and survival of all children. However, it presumably is pregnant women living in poverty conditions who would be the prime target of additional government sponsored programs for ensuring appropriate prenatal health care and counseling. Assume 3.5 million mothers a year. The percent of pregnant mothers living in poverty is at least 12 percent of the total, and may be twice as high. Splitting the difference between these two figures results in a 18 percent estimate and an absolute number of 630,000 poverty mothers in need of financial subsidy for ensuring appropriate prenatal care and counseling.

Unit Cost. How much will it cost to assist each poverty pregnant woman appropriately? Assume a total of 20 medical and 20 counselor visits per prospective mother. This permits two visits per month, plus additional visits if complications develop. Each medical visit could cost $50 and each counselor visit $25. A total of (20 X $50 + 20

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[6] For added information regarding the explosive nature of U.S. health care costs see Regina E. Herzlinger, "Healthy Competition: A Third Approach to the Medical Insurance Crisis,: The Atlantic, Vol. 268, No. 2, August, 1991 pp. 69 - 81.

X $25) $1,500 per mother. Assume an additional $500 per mother for transportation, program coordination, and, perhaps, pharmaceutical prescriptions. The total would be $2,000 for each patient. The total program would cost (630,000 X $2,000) $1.260 billion per year.

Achieving Goal #1

Assuming that goal #1 encompasses the three series of objectives specified by the National Goals Panel, necessitating the four kinds of programs described above, then the total annual costs for implementing this endeavor would approximate $30 billion.

Goal #2: The high school graduation rate will increase to at least 90 percent.

This is an easier target than Goal #1. That is it is less difficult to understand and, perhaps, easier to measure. Depending upon how the goal is specified, it may also be easier, and less costly, to achieve.

The National Education Goals Panel addressed the topic and specifies two "objectives"

The nation must dramatically reduce its dropout rate and seventy-five percent of those who do drop out will successfully complete a high school degree or its equivalent.

The gap in high school graduation rates between American students from minority backgrounds and their non-minority counterparts will be eliminated.

There are many explanations for "dropping out," and, thus, there are many appropriate "treatments." The modal explanation for leaving school, among high school age students, is "I simply cannot succeed." This is an outlook which seldom results from a single school experience and is unlikely to have come about recently. The root causes for the problem may be deep and involve a combination of in- and out-of-school factors.

Unit Cost. Given its complicated nature, it is difficult to know what assumptions to make about dropout treatment or prevention. There are those who contend that many youth leave school because they cannot perceive a sufficient connection between academic effort and subsequent employment or income. Holding part time jobs in fast food restaurants now is as attractive as staying school only to graduate and then hold a part time job in a fast food restaurant. In this explanation, the "treatment" for the dropout problem is to improve or alter economic conditions. Whereas this might be a good idea, it is not generally an alternative available to educators.

Another explanation would alter the relationship between students and teachers and other professional educators. The contention here is that if schools were more caring, more personable, and less bureaucratic, then fewer youngsters would drop out. This too may be true, but it might involve a transformation in the organization of schools of such a magnitude as to be unrealistic in the short run. The goals are specified as being achievable by the year 2000.

One of the themes frequently found in successful dropout treatment efforts is to alter the curriculum to accomplish several purposes: render it more concrete and less abstract, link schooling more closely to an actual job and job performance, and intensify the ratio of adults to students. One of the successful models in this regard is the so-called "Partnership

Academies" operating in California. Here a high school youngster participates with colleagues in a morning-offered core curriculum consisting of mathematics, science, language arts, and social studies courses oriented around an occupational theme, health, aviation, electronics, biotechnology, the media, etc. Instructors cooperate extensively to integrate themes across these subjects. Afternoons are allocated to actual paying jobs in a related industrial or commercial setting. Academic components of the core curriculum are selected deliberately to be related to these job settings. Business participation in both the academic and employment side of the equation is crucial to this endeavor.

Evaluations of the Partnership Academy model have been favorable.[7] Several of the evaluations have been based in settings where Partnership Academy students were compared on important academic and personal dimensions with a paired set of students who did not receive this "treatment." Dropout rates, as well as grades, test scores, and employment ratings, have been more favorable for Partnership Academy enrollees.

One of the benefits of this evaluation research is that the added costs of the Partnership Academy program are well documented. On average, it requires an additional $1,000 per pupil. If this is taken as a model for achieving the dropout reduction goal, then a next step is determining the number of youth for which such a treatment would be necessary or appropriate.

Number to be Served. Annually the Bureau of Labor Statistics (BLS) in the federal Department of Labor cooperates with the Commerce Department's Census Bureau in surveying the labor force. The purpose of these inquiries is to determine employment and unemployment rates. A byproduct of the surveys is an estimate of high school dropout rates. Each year in the 1980's between one-half to three-quarters of a million youth dropped out of high school.[8]

Presumably these are the youth that should serve as the target for dropout prevention and remediation efforts. At least they are the types of youth for whom some kind of intervention should be implemented before they drop out. The Partnership Academy model is a three year secondary school program. If an assumption is made that the target will be one-half million potential dropouts annually and the "treatment" requires three years, then the potential target for annual treatment is 1.5 million youth. If the added cost annually is taken to be $1,000, then the program cost would be $1.5 billion each year.

The Goal specifies that dropouts will amount to only ten percent of the high school graduation cohort by the year 2000. Perhaps, then, fewer than 1.5 million could be assumed as the target. However, it seems unrealistic to believe that any dropout prevention strategy will prove completely successful. More realistically, to achieve a 90 percent high school persistence rate, the treatment will have to be directed at virtually all prospective dropouts.

A second objective embedded in Goal #2 is reducing the disproportionate number of minority youth dropouts. The Partnership Academy model has proven equally effective for minority and non-minority youth. Thus, at least assuming this kind of treatment, there need be no particular additional cost to achieve the second objective. However, if a

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[7] "Benefits and Costs of Dropout Prevention in a High School Program Combining Academic and Vocational Education: Third-Year Results from Replications of the California Peninsula Academies." David Stern, C. Dayton, I. Paik, and A. Weisberg). Educational Evaluation and Policy Analysis, 11 (4): 405-416, Winter 1990.

[8] Digest of Education Statistics, op cit. Table 347.

different set of assumptions is made, for example, that the disproportionate dropout rates exists because of rampant racial ignorance on the part of teachers, then an additional strategy may be appropriate, and it might well have added cost implications.

Achieving Goal #2 This goal could cost $1.5 billion a year to accomplish.

Goal #3: American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography, and every school in America will ensure that all students learn to use their minds well, so that they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.

This is a breathtaking sweep, and the National Goals Panel's objectives restricted the undertaking only slightly. The Panel had five objectives linked to this goal. They are:

The academic performance of elementary and secondary students will increase significantly in every quartile, and the distribution of minority students in each level will more closely reflect the student population as a whole.

The percentage of students who demonstrate the ability to reason, solve problems, apply knowledge, and write and communicate effectively will increase substantially.

All students will be involved in activities that promote and demonstrate good citizenship, community service, and personal responsibility.

The percentage of students who are competent in more than one language will substantially increase.

All students will be knowledgeable about the diverse cultural heritage of this nation and about the world community.

A Low Cost Strategy. These objectives, in effect, necessitate a far more rigorous set of expectations for America's students and education system than now exists. It is not clear that a single strategy will achieve all the foregoing targets. However, there are those who contend that a set of individual-by-individual, high stakes, national examinations will motivate students and school systems sufficiently such that achievement will increase. If secondary school and college admission, or workforce entry, were contingent upon an individual student obtaining a high score on a national test, then, so goes the argument, youngsters would try harder and teachers, fearful of the long run ill publicity for disproportionate failure, would try harder.

All of this may be true. If so, then the resources necessary for developing and implementing a new set of national examinations, for each student in the fourth, eighth, and twelfth grades, would be relatively small. It would involve the cost of developing, administering, and analyzing tests as opposed to an expensive strategy of developing and delivering labor intensive educational programs.

Currently, the National Assessment of Education Progress (NAEP) relies upon representative samples of students in order to generalize to the nation, or in some instances,

to states. NAEP cost approximately $28 million annually for developmental and administrative activities. This is about $100 per student tested. It would be more expensive to develop a new kind of examination system to be given to, say, ten million students, all fourth, eighth, and twelfth graders, each year. Such an assessment procedure might cost as much as $200 per student assuming that the bulk of the test was some form of standardized questions lending themselves to machine readable answers. (New forms of testing, so-called authentic assessment or portfolio assessments, requiring more activity on the part of the student and greater labor intensity on the part of the examiner would be more costly.) This amount when multiplied by the number of students involved results in a figure of $2 billion.

No reliable figures exists, but it is possible that existing standardized achievement and psychological examinations now may absorb as much as 0.5 percent of the nation's total public spending on schools. If so, this is equal to $1 billion. A new national testing system might cost $1 billion more.[9]

A High Cost Strategy. Another point of view contends that American students' performance is academically flabby because American schools are starved for resources. In this line of reasoning, if the laudable objectives connected with Goal #3 are to be achieved, then a greater national resource commitment will be necessary. The school day may have to be longer, students may have to go to school for more days during the school year, more science and language laboratory facilities may be necessary, textbooks and audiovisual instruction equipment will have to be enhanced, a far greater commitment to computers will be needed, and more adults in schools may be necessary. Japan's students achieve at higher rates, but, in addition to a supportive family structure reinforcing the work of schools, Japanese students attend school for at least 220 and some attend 240 days each year, 40-60 more than the typical United States student. If you want Japanese levels of achievement, then you may have to pay for it.[10]

How much might such a high cost strategy involve? Assume that the intermediate objective were to extend American schooling 220 days. This would be forty more days than the current U.S. average, 22 percent. The easy way To determine costs is simply to extrapolate from the existing cost base.

The Department of Commerce Bureau of the Census estimates 1988-89 elementary and secondary school revenues to have been approximately $193 billion. By 1991, this figure was at least $200 billion and probably closer to $210 billion. Assume the figure, for purposes of calculation, to be $200 billion.[11] Then a 22 percent increase would equal $44 billion. By almost any standard, this is a lot of additional money.

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[9] Estimates appear in the April 1992 Office of Technology Assessment (OTA) publication, Testing in American Schools: Asking the Right Questions. U.S. Government Printing Office and the February 19, 1992 Congressional Testimony of Rand Corporation assessment specialist Daniel Koretz.

[10] Controversy exists regarding international educational expenditure comparisons. There is no agreement on whether the United States spends more or less per pupil than Japan. What is clear, however, is that Japanese teachers are, on balance, paid more, are held in higher societal regard, and instruct classes which are substantially larger than American teachers See Public Education Expenditures in Industrialized Countries: An Analytic Comparison, Alan Ran, Department of Economics, Illinois State University, 1991.

[11] Public Education Finances: 1988-89, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, April 1991, Figure 2, page xii.

Achieving Goal #3

The range of costs is wide, depending upon the assumption of a high or low cost strategy. The range is from $1 billion to $44 billion.

Goal #4: United States Students will be First in the World in Mathematics and Science Achievement.

This goal triggers skepticism among many professional educators. Well it should. American students are alleged to score consistently behind their counterparts in other industrial nations, in both theoretical and applied uses of mathematics and science.[12]

For example, in the 1989 International Assessment of Educational Progress administered by the Educational Testing Service to 13 year olds in four nations and four Canadian provinces, American students finished dead last in mathematics and tied for last in science.[13] The results of the 1990 National Assessment of Educational Progress examinations for 26,000 students in fourth, eighth and twelfth grade mathematics displayed similar dismal results. This examination, which for the first time permitted comparisons of states, also displayed that only 5 percent of all American twelfth grade students, and virtually no eighth or fourth grade students, could engage in "reasoning and problem solving involving geometry, algebra, and beginning statistics including probability."[14] Several states had virtually no students who could perform at this level of proficiency.

What is wrong? Why are American students so inept in these areas? There are numerous explanatory hypotheses, among the most powerful of which is that, as a nation, we simply expect too little of our students. However, this disregard has several practical expressions. For example, the American science and mathematics secondary school curricula are substantially different than what is offered in other industrialized nations. American students, at least those planning to go to college, typically take three years of science, one year each of a life science, chemistry, and physics. Those not enrolled in a college preparatory curriculum frequently take only general science, and perhaps only one year of that. In other nations, students take three years of all three sciences. Thus, if Goal #4 is to be taken serious, the United States will have to alter its secondary curriculum to offer more science and mathematics. Either science and mathematics will have to displace some other subjects, perhaps electives, or be added to the school day. The latter is substantially more expensive than the former.

In addition to curriculum problems, America's teachers, particularly elementary teachers, are seldom well prepared to instruct in mathematics and science. Any concerted effort to enhance U.S. student performance in these fields will almost assuredly necessitate a substantial inservice training program for teachers. However, the problem does not stop here. Inservice training should only be a stopgap measure, directed at teachers already employed in America's schools. Tomorrow's teachers will also have to undergo better

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[12]This too is controversial. Ian Westbury, "Comparing American and Japanese Achievement: Is the United States Really a Low Achiever?" Education Researcher, Vol. 21, Number 5, June-July 1992, pp. 18-24.

[13]Gregory Byrne, " U.S. Students Flunk Math, Science," Science, Vol. 243, No. 10, February 1989, p 10.

[14] See The State of Mathematics Achievement, National Center for Education Statistics, June 1991, p 55.

preparation than they receive today. Preservice preparation programs will also have to be buttressed.

Curriculum revision and teacher training are at least two major program components for achieving the science and mathematics objectives. The National Goals Panel was aware of these difficulties when it formulated the objectives for this goal. Specifically, the Panel mentions the following as targets to be sought:

Mathematics and science education will be strengthened throughout the system, especially in the early grades.

The number of teachers with a substantive background in science and mathematics will increase by 50 percent.

The number of U.S. undergraduate and graduate students , especially women and minorities, who complete degrees in mathematics, science, and engineering will increase significantly.

The nation experienced a similar policy push in the 1960's, following the 1957 launching of the first Soviet space satellite, Sputnik. At that time, under the auspices of the newly enacted National Defense Education Act (1958) and a reinvigorated National Science Foundation (NSF), the United States set about to revitalize its science curriculum and retrain its teachers. The results of this effort are, at best, mixed. It was not clear that American scientific and technological prowess was ever second to the Soviets. The decision not to compete in aerospace was a policy judgment reached early during the Eisenhower Administration. National embarrassment regarding space necessitated a whipping boy, and the schools, as ever, were convenient. Regardless, little if any evidence suggest that the NDEA or the massive NSF curriculum revision and teacher training efforts altered student achievement or had any lasting effects upon classrooms and teachers. Indeed, if they had been successful, why would the U.S. again be facing the problem.

Leaving aside criticisms of the past, NDEA and NSF do provide a baseline against which to project future cost levels. If one assumes the NDEA and NSF curriculum reform and teacher training efforts to be a model, at least for costs, then it makes most sense to judge these cost when the two programs were fully operating, for example in 1961. In that year, the two together allocated approximately $200 million in program funds to U.S. schools. Under NDEA auspices, another $200 million was distributed in student loans to encourage undergraduates to become teachers, particularly science and mathematics teachers. This is a total of $400 million, which, when adjusted for inflation over the intervening thirty years, equals $2 billion in 1991 dollars.

This figure, however extravagant or pathetic one judges it to be, does not include any additional costs for expanding the secondary school curriculum to encompass additional science and mathematics offerings. Perhaps, should such happen, it could be covered by a portion of the $44 billion discussed in the above-listed "High Cost Strategy" for Goal #3.

Achieving Goal #4 The estimate is $2 billion for an intense inservice teacher training effort.

Goal #5: Every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

This too taxed the National Goals Panel to be specific. That body answered as follows:

Every major American business will be involved in strengthening the connection between education and work.

All workers will have the opportunity to acquire the knowledge and skills, from basic to highly technical, needed to adapt to emerging new technologies, work methods, and markets through public and private educational, vocational, technical, workplace, or other programs.

The number of high quality programs, including those at libraries, designed to serve more effectively the needs of the growing number of part-time and mid-career students will increase substantially.

The proportion of those qualified students (especially minorities) who enter college, who complete two years and who complete their degree programs will increase substantially.

The proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially.

As with the other goal objectives, there are multiple strategic means by which the nation might set about to meet these targets. For example, minimalists might again contend that a stringent national examination to determine job skill levels and upon which many major employment decisions would be based, might have an intensifying effect upon student motivation. If the examination were to be applied retroactively, that is if businesses began to inquire about scores from among those job seekers who already have graduated from high school, then those now in the labor force might also be motivated to upgrade their skills.

Should such a high stakes examination strategy be invoked, the cost need not be high. Indeed, it would be possible to require that applicants for jobs themselves pay for taking the examination, much after the manner in which college applicants now pay to take ACT and SAT examinations. Fee subsidies could be arranged for those whose low income disadvantaged them on this dimension. Under this scenario, there is little additional program cost other than gathering the statistical data necessary to measure national progress toward achieving the goal.

There are those, however, who contend that problems involved in building and sustaining a high tech labor force do not lend themselves easily to a single sweeping solution. For them, Goal #5 may translate more realistically into several kinds of practical programs such as expanded student financial aid, adult continuing education incentives and opportunities for those now in the workforce, and expanded part time schooling opportunities.

Here again, however, unless greater specificity is provided, it is not clear that such programs necessarily call for large added public subsidies. They could. For example, if increasing the number of college students, and particularly college completing students, was interpreted as an economic problem, then perhaps student stipends would be the policy of choice instead of low interest, but repayable loans. Similarly, public subsidies and incentives could be offered to stimulate current workforce participants to upgrade their

skills. On the other hand, these incentives could be offered by businesses or through payroll deduction and matching programs established by the private sector itself. In short, as complicated as the solutions might be, they do not necessarily call for massive public financial subsidy.

This goal is achievable with or without added public funding. That is not to claim that it can be accomplished at no cost. Rather, it may be accomplished with the financing coming from those who might benefit most directly, workers and employers.

Goal #6: Every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning.

The number of strategies offered to enhance student learning is no greater than those proffered to rid society, and schools, of drugs.[15] This is an enormously complicated, and controversial, arena;. The National Goals Panel offers the following specific objectives:

Every school will implement a firm and fair policy on use, possession, and distribution of drugs and alcohol.

Parents, businesses, and community organizations will work together to ensure that schools are a safe haven for all children.

Every school district will develop a comprehensive K-12 drug and alcohol prevention education program. Drug and alcohol curriculum (sic) *should be taught as an integral part of health education. In addition, community-based teams should be organized to provide students and teachers with needed support.*

These objectives do not appear costly to implement. School districts might benefit from implementation incentives and technical assistance. What are examples of good policies? How does one induce businesses and community organizations to cooperate with schools? What are examples of useful drug and alcohol prevention education programs? These are products and services which could be provided by federal and state agencies to local school districts at low costs. They seem to be puny instruments for dealing with a Goliath-like problem, but the purpose of this paper is to estimate cost not offer criticisms. These demonstration and incentive efforts could probably be accomplished for as little as or less than $50 million annually.

Achieving Goal #6

Suggested strategies, while perhaps timid are not costly. The estimate is $50 million.

Summing the Costs: What is the Total?

The foregoing cost estimates have involved huge assumptions and sometimes wide ranges. However, when looking over the entire set of activities, the total cost appears to range from approximately $34 to $77 billion. The big difference is the assumption one makes

[15] A 1992 Drug Enforcement Administration analysis suggested that drug use cost the U.S. economy $76 billion a year.

regarding Goal #3. If the low cost, minimalist strategy is taken as sufficient, then total costs are relatively low, less than 15 percent of what is now spent on American public schooling. However, if the high cost strategy is thought to be necessary, the total is much higher, representing approximately 39 percent of what is now spent on public schools

But Can We Afford the Bill?

Given that the nation spent more than $50 billion on the Gulf War and is predicting expenditures of $250 billion or more to salvage the Savings & Loan industry, the $34 to $77 billion ranged for achieving the nation's education goals appears reasonable. However, the problem is a bit more complicated. Achieving the national goals is, presumably, an ongoing effort. It cannot be achieved in one year, or even in the time between now and 2000. Even if the goals are achieved, one would not want to revert to today's performance levels. The programs would assuredly have to be maintained, year after year. Thus, the costs of goals must be considered in the context of time, recurring every year into the indefinite future. Under such a scenario they are a more costly undertaking than the Gulf War or even the S & L bailout.

A more fitting comparison may be with other endeavors for which recurring cost are high. Defense is the conventional whipping boy in this regard. However, education spending is rapidly beginning to supercede the total costs of defense. Any comparison on this dimension may leave educators coming up short of arguments. However, health costs offer an interesting contrast.

Regina E. Herzlinger asserts regarding health:

> *Health expenditures, at $676 billion last year (1990) strain belief. In 1988, they accounted for one out of every nine dollars of our Gross National Product, nearly twice the proportion in Japan. The health care expense of the business sector nearly equals its after tax profits, and the many attempts to control these expenses are now conceded to be failures. Because health care costs grow more rapidly than the economy, (their growth was 60 percent higher than general inflation in 1988) they will command an ever larger fraction of our GNP.*[16]

Few would contend that the nation's health is trivial. However, few can argue that the nation's long run survival depends any less upon the education of its citizenry than it does upon their health. In short, when we ask the question can we afford to achieve our nation's new education goals, the all too obvious answer is that we cannot afford not to try.

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16 Herzlinger, op cit. p. 69.